DOCUMENT RESUME

ED 360 932 HE 026 670

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TITLE Optional Subjects in Secondary Education and Demand of University Degrees: Consistency and Implications for the Basque Country University. AIR 1993 Annual Forum Paper.
PUB DATE May 93
NOTE 18p.; Paper presented at the Annual Forum of the Association for Institutional Research (33rd, Chicago, IL, May 16-19, 1993).
PUB TYPE Information Analyses (070) -- Reports - General (140) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Access to Education; Career Choice; *Course Selection (Students); Educational Change; *Educational Demand; Foreign Countries; Higher Education; Majors (Students); School Registration; Secondary Education; *Student Educational Objectives; *Student Interests; Supply and Demand; Undergraduate Study
IDENTIFIERS *AIR Forum; Spain; *University of the Basque Country (Spain)

ABSTRACT

The Reform of Secondary Education carried out in Spain in recent years has given rise to an increased number of options for students. This study empirically analyzed the consistency between options chosen by students in secondary education and the later demand for degrees at the higher education level. The sample consisted of two cohorts of students from secondary education that entered the Basque Country University (Spain). The consistency of the initial demand (preregistration) and the final demand (registration) for degrees is then analyzed as are the negative consequences of students' studying for a degree other than the one originally preferred. Also included is a brief discussion of the predictive factors of demand for higher education degrees. The study's findings suggested that it is not advisable to have great numbers of students entering courses other than the ones they wish to follow because such a condition will certainly affect the interest and motivation for the courses. Contains eight references. (Author/GLR).

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ED 360 932

PAPER: "Optional subjects in Secondary Education and Demand of University Degrees: Consistency and Implications for the Basque Country University".

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for Management Research, Policy Analysis, and Planning

This paper was presented at the Thirty-Third Annual Forum of the Association for Institutional Research held at the Chicago Marriott Downtown, Chicago, Illinois, May 16-19, 1993. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum Papers.

Jean Endo
Chair and Editor
Forum Publications
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Abstract:

The Reform of Secondary Education carried out in Spain in recent years has given rise to an increased number of options and branches for students. The study empirically analyzes the consistency between the options chosen by students in secondary education and the later demand of degrees in higher education, from a prospective point of view. The sample consists of two cohorts of students from secondary education that enter the University of the Basque Country (Spain). The consistency of the initial demand (preregistration) and the final demand (registration) of degrees is also analyzed as well as the negative consequences of having to study a different degree from the one originally preferred.

Introduction

This paper presents some of the results from a series of studies (Apodaca, Grao et al., 1986, 1990, 1991) on predictive factors of Demand of Higher Education Degrees and Academic Performance at the University of the Basque Country (Spain).

The aim of the work presented here is to analyze those characteristics of students that are able to predict ther demand of higher education degrees. By no means causal hypothesis of an explanatory nature are intended in it, but only a description of those variables most closely associated with the demand.

Thus, two cohorts of higher education students were followed up from Secondary Education until they finally registered at a higher education degree at the University of the Basque Country. The data analyzed range from secondary school qualifications, through the administrative stages of preregistration, exam of access and registration, to formal access to higher education.

To place the discussion in context it is necessary to explain that in Spain General Secondary Education is formed by a three year basic certificate (Bachillerato Unificado Polivalente - BUP) followed by a fourth year orientated towards higher education (Curso de Orientación Universitaria - COU). The General Education Act (1970) organised both levels around a structure of core and optional subjects. The original purpose was to overcome the traditional dichotomy Sciences/Arts but in practice the students that chose Option A ("Arts") avoided Mathematics and the ones who chose Option B ("Sciences") never took up Spanish and Literature.

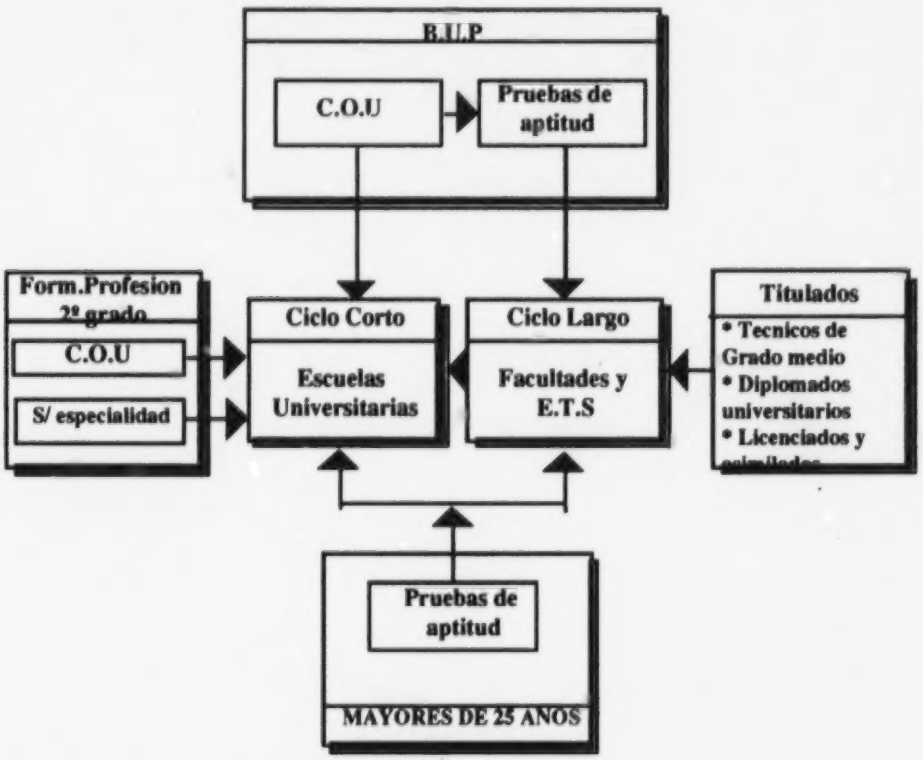
With the objective of overcoming the limitations and defects of the existing education system, a new Law, the LOGSE has been approved to try and reform secondary education. In short, it decrees that:

- the two final years of primary education (EGB) and the two initial years of secondary education merge into a new four year educational level, Obligatory Secondary Education.
- a Post-Obligatory Secondary Education of two years of duration is implanted under the principles of unity, diversity and transfer. Four different branches are offered:
    - Social Sciences
    - Natural and Health Sciences
    - Technology
    - Arts

The educational system includes a compulsory core curriculum, common to all four branches, and an optional curriculum specific to each of them. It seems clear that there is a general agrement on the need to combine wide general education with more specialised training of a many-sided character. In a framework of deep and constant changes, a premature specialisation appears to limit the possibilities of future adaptation.

In Spain Higher Education is delivered in *Facultades* (University Faculties), *Escuelas Técnicas Superiores (ETS)* (Polytechnics, but only for long degrees)y *Escuelas Universitarias.* (Higher Education School or Colleges). Figure 1 illustrates the different ways of access to it.

Figure 1. ACCESS TO HIGHER EDUCATION DEPENDING ON PREVIOUS LEVEL OF STUDIES



Our study is only concerned with the population that has gone through the fourth year of Secondary Education (COU) and has passed the Exam of Access to the University (Selectividad). That is to say, those students have not gone through the reformed system.

Method

The data for the study were gathered from the administrative database of the University of the Basque Country. The appropriate files were scanned to verify if the predetermined flow Preregistration-Exam of Access-Registration (P-E-R) was complete. Loss of information for unknown reasons was not present; students that disappeared from one stage to the other did so for the usual reasons of moving to a different university to study, no need of going through the exam of access for the studies chosen, gaining access through the "over 25" entrance, etc.

Once a unique file containing the students with the complete (P-E-R) information was obtained, purged, recodification and creation of new variables were carried out through a wide range statistical package such as SPSS.

A descriptive analysis of a bivariate type, crossing the variables to be predicted with each of those variables which might be relevant, was first carried out. The main object at this stage of the process was to obtain a general overview of the characteristics of students, taking into account the three aspects of previous academic records, sociodemographic data and demand of university studies. Nevertheless a global and effective characterisation of students can not be reduced to the mere inventory of the weight of each subgroup nor to the mere comparison of the several groups from a bivariate standpoint. Although aware of the importance of this first stage of analysis, the need to use multivariate statistical procedures (mainly factorial reduction and clustering technics) became evident.

After selecting the variables with higher predictive value, the relationship between the variables was analysed by multivariate procedures. Due to the limitations of an oral presentation like this, the bivariate analyses that support the subsequent multivariate analyses will be omitted (Apodaca, Grao, Martínez and Romo, 1991).

The specific procedure of factor extraction employed for the multivariate analyses was multiple correspondence analysis (Benzecri, 1980; Cibois, 1983). This sort of analyses is carried out by the SPAD Statistical Package developed by the French Centre of Applied Computer Science, CESIA (Lébart and Morineau, 1977; 1981).

Before ending the methodological section, some clarifications about the scope and characteristics of the research are needed:

- the study does not work on samples, so problems related to generalization and random error are on the most part not present.

- the study is done on the basis of administrative records (Preregistration-Exam of Access-Registration) which are necessarily correct in most cases.
- a longitudinal followup of a group of students is carried out for a period of four years De Miguel, 1985).

Predictive Factors of Demand of Higher Education Degrees.

Though not the main object of this paper, the most important results obtained with some of the other predictive factors of Demand of Higher Education Degrees will be briefly mentioned here before focusing on the effect of the options in secondary education on that demand.

- Sex proves to be an important predictive variable of demand for certain degrees. Thus, degrees such as Engineering and Architecture are mainly chosen by men. On the contrary, Nursing, General Teacher Training. Philosophy, Psychology and Education Science are mainly chosen by women. For other degrees this variable is not shown to be relevant.

- With regard to the indicators of Status, Father's Profession, Mother's Level of Education and Type of Secondary School, where the fourth year of secondary education (COU) was studied, they have a significant relationship with the Demand of Higher Education. This relationship is unclear for many of the degrees but quite clear for some. For instance, students that demand Architecture of Engineering tend to be from a status above the mean. On the contrary, demanders of Philosophy, Geography, History, General Teacher Training and Nursing belong to a lower status.

- The geographical area of residence, that reflects the influence of the distance between home and campus when demanding certain degrees, has appeared as an important predictive factor. Those degrees that can only be studied in one of the three sites of the University of the Basque Country are clearly shown to have a higher percentage of students from that same geographical area than from the other areas.

- Consistently with most part of the literature, previous academic performance is the decisive factor in the choice of higher education degrees. For certain degrees such as Medicine or Nursing where "numerus clausus" are in operation, it is crucial. However, even for degrees that do not have such a filter of access, previous academic performance is a relevant predictive factor.

In summary, when trying to predict Demand of Higher Education Degrees, Previous Academic Performance and Sex appear as the main factors to consider. Another variable such as Geographical Area of Residence has also to be taken into account.

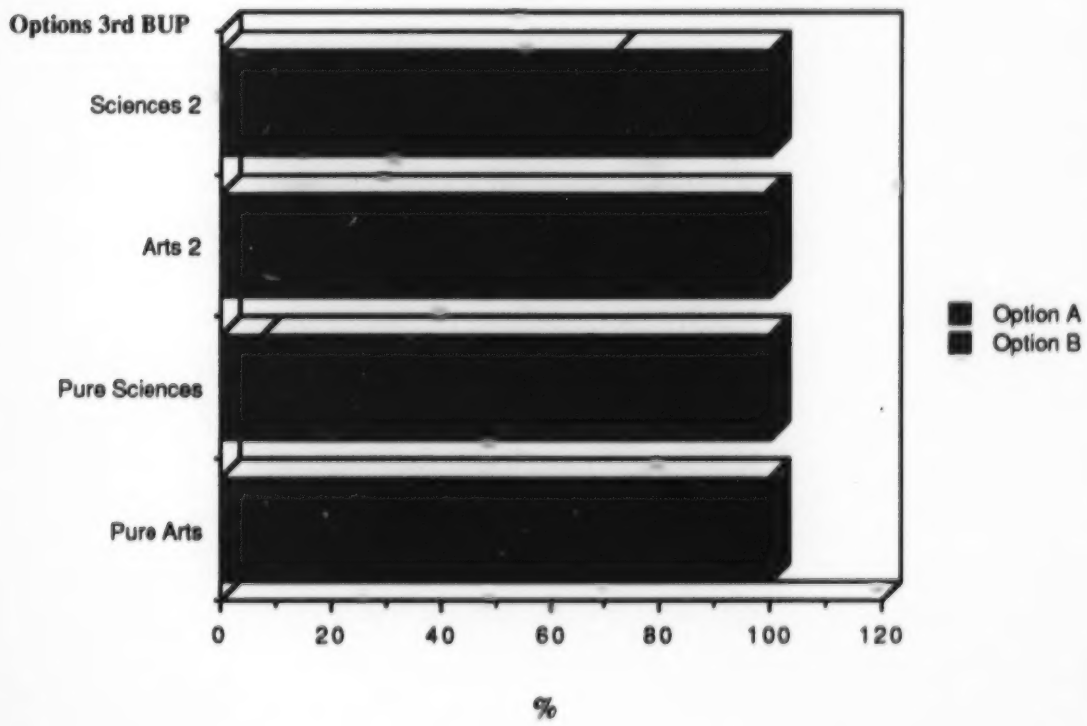
OPTIONS IN SECONDARY EDUCATION AND DEMAND OF HIGHER EDUCATION DEGREES.

On the basis of our empirical work, we will summarise the implications that the availability of options have in the demand of university courses.

Agrement between options in Third of BUP (General Secondary Education) and COU (fourth year orientated towards higher education)

As shown in Figure 2, accordance between the options taken in Third of BUP and in COU is practically total for the students of "Arts" (Option A), those students that took up two options considered of "Sciences" presenting a high level of transfer to Option A (72,1%).

Figure 2. ACCORDANCE 3rd BUP-COU



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Thus, it can be concluded that there is greater consistency in the choice of courses in COU by those students that opt for Arts in Third of BUP.

Options in COU (fourth year of secondary education oriented towards higher education) and initial Demand of Higher Education Degrees.

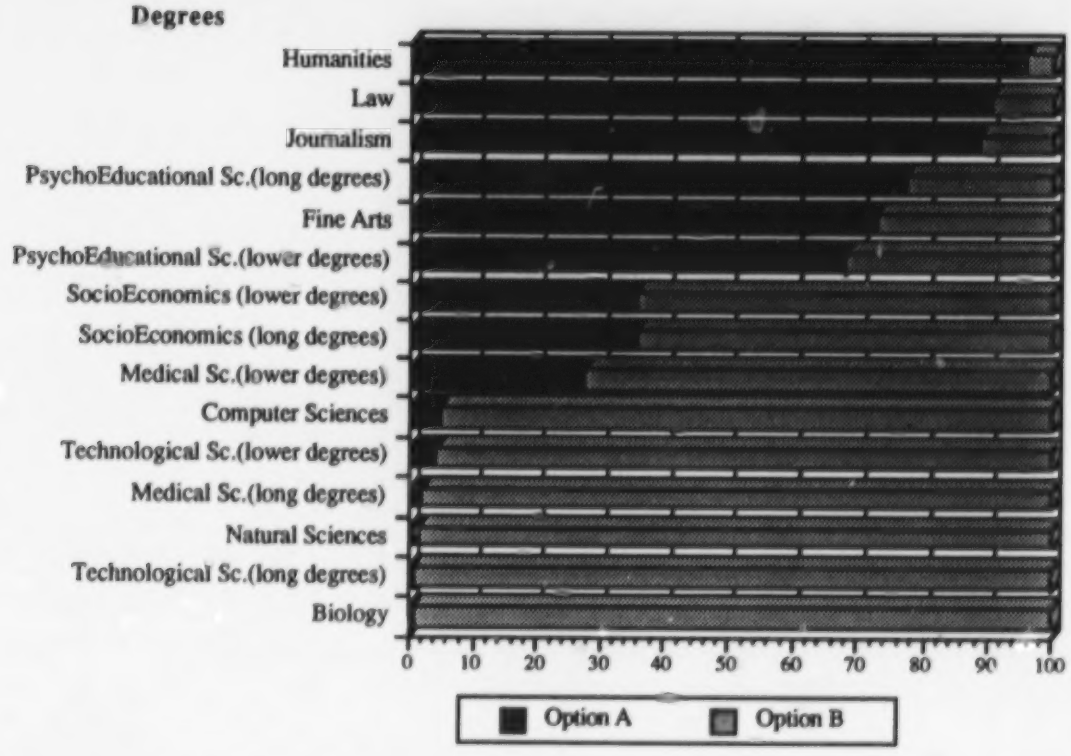
To study the consistency between the option taken in COU and the first choice of degree at preregistration, the specific weight of students from each option (A/B) in Secondary Education was analyzed for each degree.

According to this indicator, as shown in Figure 3, students that took option B in COU - considered as Sciences- express their preference towards Biology (99,3% of those demanding this degree come from this option), Engineering and Architecture (99,2%), Natural Sciences, (98,5%), Medicine (97,9%), Engineering, lower degree (95,8%) and Computer Sc.(95,1%).

Preferences are not so clear-cut for those students that took option A (Arts). 95,9% go to Philology , Geography and History, 90,3% to Law and 88,4% to Journalism.

These results seem to confirm the existence of certain genuine Arts degrees and certain genuine Sciences.

Figure 3. OPTIONS IN COU AND PREREGISTRATION (1st choice)



Students demanding psychoeducational type of degrees come mainly from the Arts Option and those choosing socioeconomical type of degrees from Sciences but both families of degrees attract a number worth mentioning of students from the opposite option.

The same percentage of students but from the opposite option choose Nursing (Option B) and Fine Arts (Option A).

When the analysis is performed with the options in Third of BUP, similar results are found for the "Sciences" degrees. For the "Arts" degrees the correlation is however less pronounced due to the number of students that change to Option A in the transit from Third of BUP to COU.

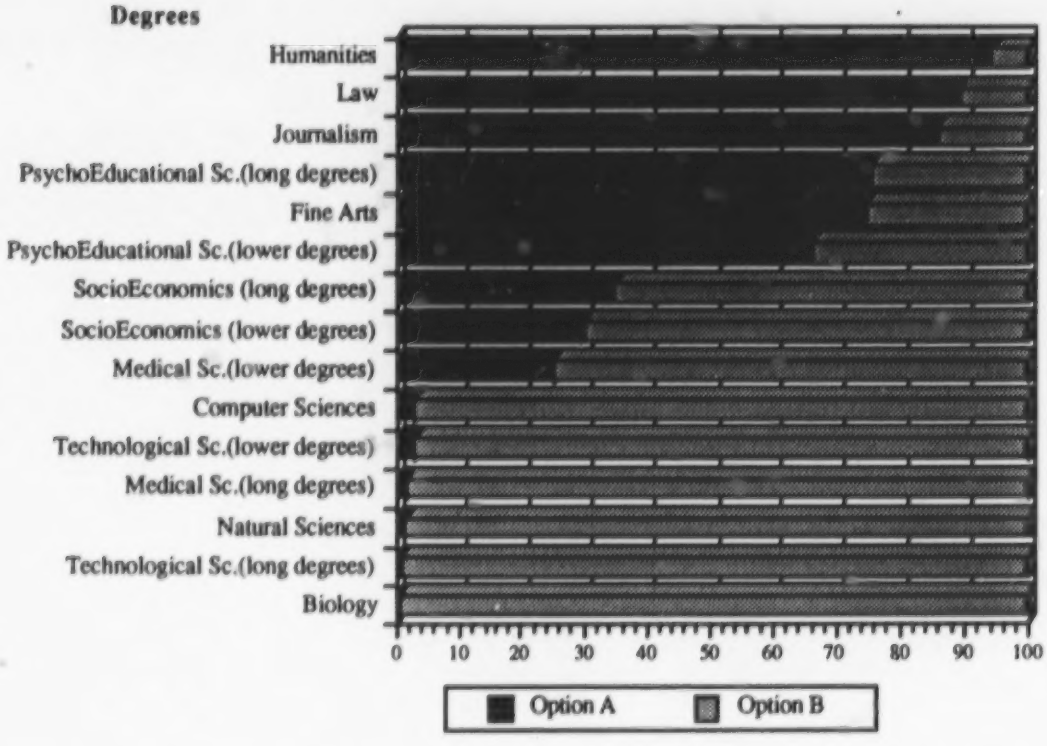
Options in COU and Final Demand of Higher Education Degrees.

The results obtained by crossing the options in COU with the final registration (final demand) are practically the same as those obtained by crossing them with the first choice at preregistration (initial demand).

Final registration of students that followed Option B in COU increases slightly in the "Scientific" Degrees compared to preregistration: Biology (99,5%), Engineering and Architecture (99,4%), Natural Sciences (98,7%), Medicine (98,3%), Engineering-lower degree (97,1%) and Computer Sc.(96,9%).

In contrast, final registration of students from Option A in COU is reduced in "Arts" Degrees: Philology, Geography and History (94,6%), Law (89,3%) and Journalism (86,0%).

Figure 4. OPTIONS IN COU AND FINAL REGISTRATION



It was also found that 90% of the students that took Option A in COU were finally able to register in the degree they put down as first choice at preregistration. This was only the case in less than 80% of students that took up Option B. Options followed in Third of BUP do not affect these results.

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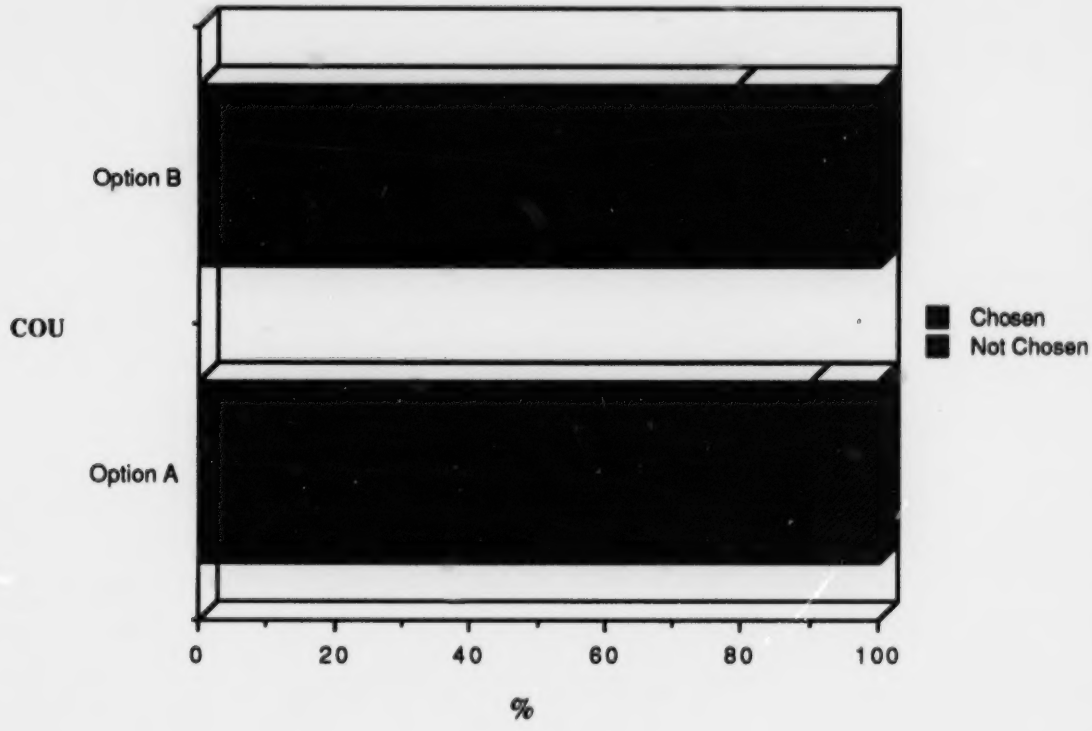
Figure 5. ACCORDANCE PREREGISTRATION-REGISTRATION



At this stage we should look closer at the fact that a part of the students can not finally follow the courses originally preferred. At preregistration students choose the degrees they would like to read in order of priorities. It can be observed that part of them can not in fact register in those degrees chosen in the first place. The reasons can range from not being able to fulfil the access requirements of some courses to a change of opinion on the student's part.

In general those degrees that present a big lapse between initial and final demand are:

- Medicine
- Nursing
- Computer Sc.
- Technological Sc. (higher degrees)
- Socioeconomics (higher degrees)
- Psychoeducational Sc. (lower degrees)

On the contrary, the degrees that end up absorbing the transfer from the extra demand of the above are:

- Biology
- Natural Sciences (Chemistry, Geology, Physic, Mathematics)
- Socioeconomics (lower degrees)
- Technological Sc. (lower degrees)

The degrees that show a good balance between initial and final demand are:

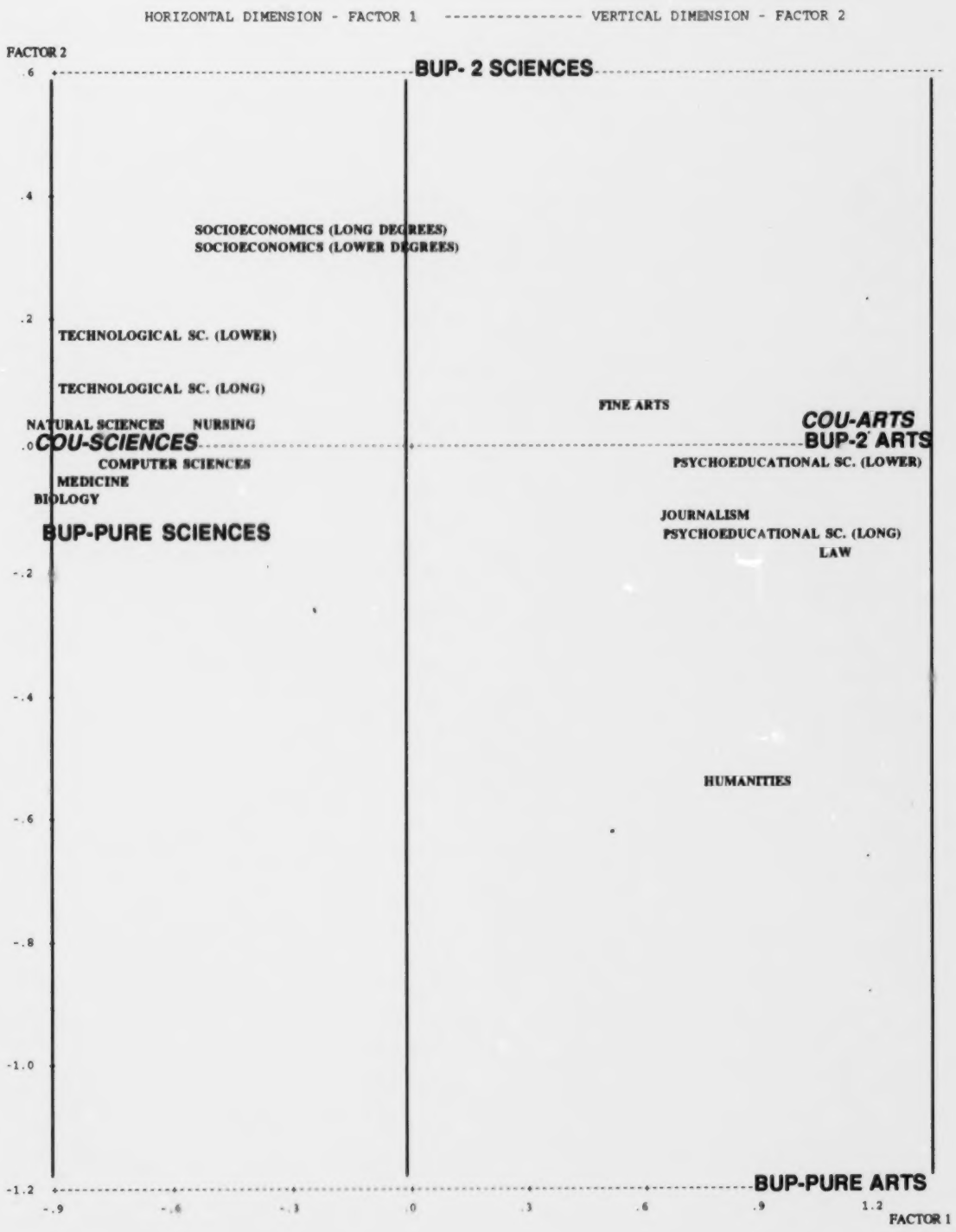
- Fine Arts
- Law
- Humanities (Geography, History and Philology)

The growing number of young people that demand higher education is causing an increase in selectivity of access. The use of "numerus clausus" tends to generalise. This leads to an increase of the above mentioned transfers which result in a number of students that enrol in a higher education degree without a vocation or real interest in it. We can only describe this situation as undesirable. It can even get worse when the so called "Unique District" comes into action. Transfers will occur not only between degrees but also between universities. Whatever the interpretation and assessment of this problem, we find it of great interest for the analyses of future cohorts of students.

Graphic and Global Analysis

With the aim of showing in the most simple and synthetic way the lines of relationship between the options in Third of BUP and in COU and the Higher Education Degrees demanded, an analysis of Correspondence was performed. Figure 6 shows the factorial solution starting from two variables: options taken in COU and options taken in Third of BUP. The first factor, horizontal dimension of the figure, clearly shows the opposition between, on one hand, the Science Option in COU and the option for three subjects of Sciences in Third of BUP and, on the other hand, the Arts Option in COU and the option for two or three subjects of Arts in Third of BUP.

Figure 6. OPTIONS IN BUP-COU AND DEMAND OF UNIVERSITY DEGREES



The vertical dimension mainly shows an opposition that does not appear in Factor 1: the opposition between having taken two subjects of Sciences in Third of BUP and having taken all the subjects of Arts in Third of BUP.

The component of both axes shows a geometrical space with four significant extremes. At the left-middle extreme we can see the clearly Science options, at the lower-right extreme the clearly Arts option, at the right -middle extreme a profile we could call mixed Arts (two subjects of Arts in Third of BUP) and finally, at the middle-top extreme an ambiguous profile (two subjects of Sciences in Third of BUP).

Now, if the different Degrees are placed on that geometrical space already endowed with meaning, their profile appears evident. The degrees with a clear profile of previous options in BUP and COU are:

- Technological Sciences.
- Natural Sciences (Physics, Mathematics, Chemistry, Geology)
- Nursing
- Computer Science
- Medicine
- Biology

The degrees whose profile is defined by the Arts Option in COU and at least two subjects of Arts in Third of BUP are:

- Fine Arts
- General Teacher Training
- Journalism
- Psychology, Education Sc. and Philosophy
- Law

The case of Philology, Geography and History would be even more extreme within the Arts profile since many of their students took all subjects of Arts. In contrast, the profile for Economics and Business Administration is not clear with regards to the option taken in COU since two of the options in Third of BUP tend to be Sciences.

In summary, it seems that the options taken in BUP and COU, though limited, indicate a quite consistent behaviour on the student's part when faced with demanding higher education courses.

Conclusions

1.-If we exclude the "deserters" from Sciences in the transit from 3rd BUP to COU, it can be concluded that there is a high concordance between the options taken in COU and the demand for university degrees.

2.-We recognise the existence of "mixed" degrees, i.e. Socioeconomics, Psychoeducational, Nursing, Fine Arts, where "clients" come from any of the pre-university options.

3.-The students that pursue Option A in COU have a higher level of satisfaction since they have more possibilities of fulfilling their expectations to start certain university courses. The Science degrees pose more difficulties of access.

In spite of the limited range of options in BUP and COU, those options appear as highly significant in predicting future demand of higher education degrees.

The new range of pre-university options introduced by the Reform and the limits it poses to the access to certain university courses will enhance the links between both levels of education.

A point of special interest is the relationship of initial demand (pre-registration) and final demand (registration), that is, between the courses that a student applies for and those in which he finally registers. Due to the strong limitations of access to certain courses such as Medicine, Nursing, Computer Science, Economics and Business Administration and General Teacher Training, these receive a considerably greater number of demands than those that finally absorb the actual undergraduates. This originates a diversion of registrations of rejected students towards courses they had not originally applied for. Among those degrees which many students did not apply for in the first place are: Biology, Business Administration (lower degree) and Engineering (lower degree). Whatever other interpretations, it does not seem advisable that great numbers of students enter courses other than the ones they wish to follow. This surely affects the interest and motivation for the courses.

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